Schlieren confocal microscopy: easily expand confocal to phase imaging

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1. Summary

An optical phase relief imaging technique, termed Schlieren confocal microscopy (SCM) had been developed to combine the confocal laser scanning microscopy with the phase-sensitive imaging. Based on a fluorescence confocal microscope, SCM employs only a piece of fluorescence medium on the top of the specimen, and a partial block in the propagation path of the fluorescence signal. Compared to traditional phase contrast microscopy method like Phase Contrast (PC) and Differential Interference Contrast microscopy (DIC), this method is convenient to be implemented on a confocal system since no N0maski prisms or polarization filter is required [1,2]. Compared to the laser oblique scanning optical microscopy (LOSOM) we put forward earlier [3], shift of the detection optical path is no longer required. Two types of Schlieren confocal microscopy are investigated: Type 1 uses a uniform fluorescence medium and partial beam obstruction, and Type 2 uses a half fluorescence plate only. A good linearity between intensity and phase gradient is found, suggesting the potential of quantitative phase imaging with SCM. Also, SCM maintains the same resolution as the confocal microscopy. Mouse kidney and HeLa cell samples are imaged with SCM to obtain multi-modality images of both fluorescence and phase imaging [4].

References